TEMPERATURE AND HEAT

TASK 1: Fill in the gaps[1]

left hand	object	long time	qualitative	metal
feeling	different	ice	warm	frozen

You often associate the concept of temperature with the [1] ..... of heat or coldness that you get when touching an [2] ..... . Our senses provide us with a qualitative indication of temperature, but they are unreliable and often mislead us. Imagine putting your [3] ..... in a bucket filled with warm water, and your right hand in a bucket filled with [4] ..... cubes.

Keep your hands in the buckets for a little while, and then put them in a third bucket filled with water at room temperature. The hand that has been dipped in hot water will feel cold, while the other hand will feel [5] ..... . Therefore, you might think that the water in the bucket is both warm and cold, which would be absurd.

Similarly, when you take a [6] ..... ice cube tray and a cardboard box of [7] ..... food from your freezer, your sensations are [8] ..... : the metal box feels colder than the cardboard one. Since the two objects have been in the same freezer for a [9] ..... , they will actually be at the same temperature.

So, our senses can only give us a [10] ..... indication of how hot or cold an object is.

TRY TO ANSWER THE FOLLOWING QUESTIONS:

1) Can our hands reliably measure temperature of an object? Why?
2) Why can our hands feel an object as warm and cold at the same time? What do you think is happening?

[1] Fill in the gaps from the book "Physics CLIL 3D" ISBN: 9788863649000

TASK 2: Reading

Heat vs temperature[2]

Heat and temperature are a closely related topic, and as such, the difference between the two can be a bit confusing. The core difference is that **heat** deals with **thermal energy**, whereas **temperature** is more concerned with **molecular kinetic** and rotational **energy**.

Heat is the **transfer** of thermal energy, whereas **temperature** is a **property** the object exhibits.

What's the difference?

Heat describes the **transfer** of thermal **energy between molecules** within a system and is measured in Joules. Heat measures how energy moves or flows. An object can gain heat or lose heat, but it cannot have heat. Heat is a measure of change, never a property possessed by an object or system.

Temperature describes the **average kinetic energy of molecules** within a material or system and is measured in Celsius (°C), Kelvin(K), Fahrenheit (°F), or Rankine (R). It is a measurable physical property of an object—also known as a state variable. Other measurable physical properties include velocity, mass, and density, to name a few.

Similarities

Heat is a transfer of thermal energy caused by a difference in temperature between molecules.

PLEASE ANSWER:

1) Try to properly answer to question 2 of task 1 using the concepts expressed in task 2.
2) With your own words try to formally define **HEAT** and **TEMPERATURE**.

[2] Modified from: https://energyeducation.ca/encyclopedia/Heat_vs_temperature#:~:text=Heat%20is%20a%20measure%20of,%2C%20or%20Rankine%20(R).